

REMARKS

Applicant respectfully requests reconsideration of the present application in view of the foregoing amendments and in view of the reasons that follow.

Status of Claims

Non-elected claims 1-21 are cancelled. Claim 34 is requested to be cancelled. Claims 22 and 39 are currently amended. Claims 42-51 are being added. No new matter is being introduced by the amendments and additions. Support for amended claims 22 and 39, and new claims 42 and 43, can be found in the specification, for example on page 25, paragraph 0074 and Figure 5E. Support for claims 44-51 can be found in the specification, for example on page 29, paragraph 0082; pages 33-35, paragraph 0091-0094; pages 37-38, paragraph 0100; and pages 39-40, paragraphs 0102-0103. Upon entry of the response, claims 22-33 and 35-51 will be pending for examination on the merits.

Claims 22-27 And 32 Are Not Anticipated

Claims 22-27 and 32 are rejected under 35 U.S.C. § 102(e) as allegedly anticipated by Ohkura et al. (US 6,610,463) (“Ohkura”). Office Action, pp. 2-4. Applicants respectfully traverse.

Independent claim 22 as amended recites “wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern.” This limitation has been added to claim 22 from original claim 34, now cancelled.¹

Contrary to the instant claims, Ohkura does not describe a plurality of anodization steps. In fact, the PTO acknowledges this fact in the Office Action by indicating that Ohkura allegedly only anticipates claims 22-27 and 32. Office Action, pp. 2-4. Claim 34 is not

¹ Applicants note that original claim 34 recited “anodically anodized” instead of the “anodically oxidized” now present in the claims. The current term more accurately describes the claimed process and is not new matter, as described under “Status of Claims.”

mentioned as an rejected claim under section 102(e) by Ohkura. Accordingly, Ohkura does not anticipate claims 22-27 and 32.

Applicants therefore request withdrawal of the rejection.

Claims 39 And 40 Are Not Anticipated

Claims 39 and 40 are rejected under 35 U.S.C. § 102(b) as allegedly anticipated by Matsuda et al., (US 6,139,713) (“Matsuda”). Office Action, pg. 4. Applicants respectfully traverse.

Independent claim 39 as amended recites the same subject matter described *supra* with respect to claim 22.

In contrast to the instant claims, Matsuda does not describe a plurality of anodization steps. In fact, an examination of Matsuda as a whole reveals that the only portion of the reference which describes multiple anodization steps is in the background. Matsuda, col. 1, ll. 45-50. However, the anodization described in this section is performed “under the same condition.” Because the instant claims recite anodization a plurality of times, each time under “a different condition,” Matsuda does not teach the step of anodizing under different conditions. Moreover, nowhere in Matsuda is there a description of “a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern” as claimed. However, this is not surprising, as such an arrangement is produced by anodizing a material “a plurality of times under different conditions” as claimed, which Matsuda fails to teach. Accordingly, Matsuda does not anticipate claims 39 and 40.

Applicants therefore request withdrawal of the rejection.

Claims 22-27, 32, 36-38, 39 And 40 Are Not Obvious

Claims 34 and 36-38 are rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Ohkura. As described *supra*, although claim 34 has been cancelled, its recitation of “wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores

arranged in a predetermined ordered pattern” has been amended into independent claims 22 and 39. These claims, and their dependents, therefore deserve consideration in light of the PTO’s obviousness rejection over Ohkura. Office Action, pg. 8. Applicants respectfully traverse the rejection.

An illustration of the claimed subject matter is Figure 5E, which shows a hierarchical structure of nanopores within cells. As described in the specification, Figure 5E depicts “a hexagonal supercell 121 contains seven cells 123 each containing seven nanopores.” Specification, pg. 25, para. 0074. This arrangement can be formed when there is a difference in anodizing condition, e.g. voltage, such that “the single domain nanopore array is separated into a plurality of cells before or after forming the nanopores.” *Id.* This shows how anodizing a material multiple times under different conditions can produce nanopores and cells in the manner claimed. Applicants respectfully assert that Ohkura does not teach or fairly suggest the claimed method.

As pointed out by the PTO, Ohkura describes “setting process conditions,” which refers to determining the outcome of pore intervals by setting certain conditions, such as concentration, temperature, type of electrolytic solution, anodizing potential, etc. Office Action, pg. 8; and Ohkura, col. 7, ll. 50-57. However, this passage only teaches that the conditions used for anodization can be varied. It does not teach that multiple and different conditions can be applied in the same anodization process. This differs significantly from the instant claims, which recites that the anodization process includes performing the anodization “multiple times,” each time “under a different condition.” An examination of Ohkura as a whole reveals nothing that teaches or fairly suggests performing multiple anodizing steps where each step is performed under a different condition. Moreover, Ohkura fails to describe that the “setting process conditions” can be applied to produce “a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered symmetric pattern.” In fact, Ohkura does not even describe such an arrangement. While the figures and corresponding description depict array of nanopores, they are not placed in individual cells and not described as being created through repeated anodization under different conditions. Accordingly, one of ordinary skill in the art reading Ohkura as a whole would not have been

led to anodize a material multiple times under different conditions to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered symmetric pattern.

Applicants therefore respectfully assert that independent claims 22 and 39, and their dependents, would not have been obvious over Ohkura.

Claims 28-31, 33 And 35 Are Not Obvious

Claims 28-31, 33 and 35 are all rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Ohkura in view of Zhang et al. (US 6,709,929) (“Zhang”), Iwasaki et al. (US 6,278,231) (“Iwasaki”) or Sekinger et al. (US 5,975,976) (“Sekinger”). Office Action, pp. 5-7 and 9-10. Applicants respectfully traverse.

As described *supra*, Ohkura does not anticipate or render obvious independent claim 22 because it fails to teach or fairly suggest the subject matter “wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern.” Zhang, Iwasaki and Sekinger do not remedy this deficiency.

An examination of Zhang reveals that the methods described therein can be subjected to a “repeated anodization process.” Zhang, col. 6, ll. 58-59. However, Zhang does not teach that repeated anodization is performed under “different conditions,” but simply that anodization can be repeated. Moreover, Zhang fails to teach that the repeated anodization process can produce “a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered symmetric pattern” as claimed. One of ordinary skill in the art, therefore, reading Zhang and Ohkura in combination would not have been led to apply different conditions for each of the anodizing steps. Instead, one of ordinary skill in the art would have simply performed multiplied anodization steps under the same conditions, which is inconsistent with the claimed invention. Accordingly, the combination of Ohkura and Zhang do not teach or fairly suggest the claimed step of repeated anodization under different conditions.

An examination of Iwasaki reveals no description of multiple anodization steps and does not fairly suggests performing these steps. In fact, Iwasaki describes applying a constant temperature and constant voltage during the anodization process. See for example, Iwasaki, col. 7, ll. 51-52 and col. 15, ln. 14 to col. 28, ln. 67 (describing First Embodiment to Nineteenth Embodiment as anodizing with constant voltage). Moreover, Iwasaki fails to describe anodizing to produce “a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered symmetric pattern” as claimed. One of ordinary skill in the art would therefore not have been led by the combination of Ohkura, Zhang and Iwasaki to anodize a material “a plurality of times under different conditions” as claimed. Accordingly, the instant claims are not obvious.

Sekinger describes increasing or reducing voltage continuously during anodization. Sekinger, col. 4, ll. 13-17. However, Sekinger does not describe that this change in voltage produces “a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered symmetric pattern” as claimed. In fact, an examination of Sekinger as a whole reveals nothing in the reference that teaches or suggests altering anodization conditions between anodization steps for producing cells with a predetermined pattern of nanopores within. Accordingly, the combination of Ohkura and Sekinger do not render the instant claims obvious.

Applicants therefore respectfully request withdrawal of the rejections.

Claim 41 Is Not Obvious

Claim 41 is rejected under 35 U.S.C. § 103(a) as allegedly unpatentable over Matsuda in view of Ohkura.

As described *supra*, neither Matsuda nor Ohkura teach the following subject matter: “wherein the first material is anodically oxidized a plurality of times, each time under a different condition, to form a plurality of separated cells, each cell comprising nanopores arranged in a predetermined ordered pattern.” For the same reasons stated previously, Applicants respectfully assert that neither reference fairly suggests. Accordingly, the

combination of Matsuda and Ohkura neither teach nor fairly suggest the claimed limitation; hence, they do not render the instant claim obvious.

Applicants therefore respectfully request withdrawal of the rejection.

New Claims 42-51 Are Not Anticipated or Obvious Over Cited Prior Art

Claims 42 and 43 are dependent upon claims 22 and 39, respectively. Hence, they are free of the cited art for the same reasons given *supra* for claims 22 and 39.

Claims 44-46 are directed to photonic crystals comprising a nanopore array within an optically transmissive layer. The cited prior art do not teach or fairly suggest a photonic crystal. Iwasaki teaches photonic devices. Iwasaki, col. 13, ln. 33 and col. 14, ln. 49. However, Iwasaki describes photonic devices generally and in the form of light emitting diodes. *Id* at col. 14, ll. 31-52. Iwasaki does not actually teach a photonic crystal as claimed.

Claims 47-51 are directed to methods of making nanoarrays with either a capacitor dielectric material, a capacitor ferroelectric material, a fusible link, or an antifuse dielectric in the nanopores. The cited prior art do not teach or fairly suggest any of these materials as fillers in nanopores.

CONCLUSION

Applicants submit that the present application is in condition for allowance, and an early indication to this effect is requested. Examiner Van also is invited to contact the undersigned directly, should she feel that any issue warrants further consideration.

The Commissioner is hereby authorized to charge any additional fees, which may be required under 37 CFR §§ 1.16-1.17, and to credit any overpayment to Deposit Account No. 19-0741. Should no proper payment accompany this response, then the Commissioner is authorized to charge the unpaid amount to the same deposit account. If any extension is needed for timely acceptance of submitted papers, Applicants hereby petition for such

extension under 37 CFR §1.136 and authorize payment of the relevant fee(s) from the deposit account.

Respectfully submitted,

Date 22 January 2008

By S. A. Bent

FOLEY & LARDNER LLP
Customer Number: 22428
Telephone: (202) 672-5404
Facsimile: (202) 672-5399

Stephen A. Bent
Attorney for Applicant
Registration No. 29,768